

# HEIGHT ADJUSTABLE CHAIR FOR A KEYBOARD INSTRUMENT

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

The present invention relates to a chair with height adjusting ability, and more particularly to a height adjustable chair for a keyboard instrument.

### 2. Description of Related Art

With reference to Fig. 9, a first conventional height adjustable chair is shown to have a seat (50), two transverse bars (51) horizontally attached to a bottom face of the seat (50) and two legs (52) each with a cross bar (522) formed on a first distal end of the leg (52) and a foot (524) formed on a second distal end of the leg (52) to engage with a surface, i.e. the ground. An inner side face of each of the transverse bars (51) is provided with multiple adjusting holes (511). The two legs (52) intersect with one another and a pin (521) is provided to extend through a joint between the two legs (52) such that the two legs (52) are pivotally connected to one another. Each cross bar (522) is a hollow tubular-like element to receive therein a spring (54) and provided with two slits (53) each defined in opposite distal edge of the cross bar (522) to respectively receive therein a handle (531). Therefore, it is noted that the spring (54) is sandwiched between the two handles (531). Each handle (531) is provided with a head (532) extending out and into one of the adjusting holes (511) such that the chair is fixed after the two heads (532) of the two handles (531) have been extended into two mutually aligned adjusting holes (511).

Normally, due to the resilient force to the handles (531) via the spring (54), the two heads (532) are received in corresponding adjusting holes (511). When adjustment of the chair height is required, the operator is able to use both hands to pull the two

1 handles (531) to drive the heads (532) away from the adjusting holes (511) and  
2 simultaneously compress the spring (54). Thereafter, the operator is able to adjust the  
3 height of the chair by moving the legs (52) between the two transverse bars (51).

4 However, adjusting the position of the cross bar (522) relative to the transverse  
5 bar (51) requires the operator to simultaneously pull the two handles (531) on the same  
6 cross bar (522), which is quite troublesome and difficult.

7 With reference to Fig. 10, a different conventional height adjustable chair is  
8 shown and has a seat (60) and two legs (61) interconnecting with each other. Each leg  
9 (61) has multiple adjusting holes (611) defined along a length of the leg (61). Thus a pin  
10 (62) extending through two aligned adjusting holes (611) respectively on each of the  
11 two legs (61) is able to secure the engagement between the two legs (61). Changing the  
12 position of the pin (62) is then able to change the height of the chair. However, it is noted  
13 that after the pin (62) is withdrawn from two aligned adjusting holes (611), the operator  
14 has to realign two different adjusting holes (611) to allow the extension of the pin (62).  
15 Realigning two different adjusting holes (611) requires extreme focus otherwise the pin  
16 (62) may not be able to extend therethrough. Furthermore, the operator has to spare one  
17 hand to hold the chair in position or the two adjusting holes (611) from different legs (61)  
18 may not be aligned even after the alignment is readjusted. Therefore, the conventional  
19 chair is not handy in use.

20 To overcome the shortcomings, the present invention tends to provide an  
21 improved height adjustable chair to mitigate the aforementioned problems.

## 22 SUMMARY OF THE INVENTION

23 The primary objective of the present invention is to provide an improved height  
24 adjustable chair whereby the operator is only required to pull a handle to release the

1 positioning mechanism of the chair and then the chair is ready for height change.

2 Another objective of the present invention is that the handle is connected to a  
3 driving plate by a linking element and the driving plate is respectively and pivotally  
4 connected to a first driving plate and a second driving plate. Thus the pivotal movement  
5 of the handle is able to drive the first and second driving plates to move simultaneously  
6 to retract two positioning blocks and the chair is ready for height change.

7 Other objects, advantages and novel features of the invention will become more  
8 apparent from the following detailed description when taken in conjunction with the  
9 accompanying drawings.

#### 10 BRIEF DESCRIPTION OF THE DRAWINGS

11 Fig. 1 is a perspective view of the height adjustable chair of the present  
12 invention;

13 Fig. 2 is a perspective view showing that the chair of the present invention is  
14 placed upside down to see the adjustable mechanism of the present invention;

15 Fig. 3 is an exploded perspective view showing the elements of the adjustable  
16 mechanism;

17 Fig. 4 is an enlarged perspective view showing the assembly of the adjustable  
18 mechanism;

19 Figs. 5 and 6 are schematic side plan views showing the adjustment of the  
20 adjustable mechanism of the present invention;

21 Figs. 7 and 8 are schematic side plan views showing the height of the chair is  
22 changed in response to the adjustment of the adjustable mechanism;

23 Fig. 9 is a perspective view of a conventional height adjustable chair; and

24 Fig. 10 is a perspective view of a conventional height adjustable chair.

1 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

2 With reference to Figs. 1 and 2, it is noted that the height adjustable chair in  
3 accordance with the present invention includes a seat (10) and two legs (12) pivotally  
4 interconnected with one another.

5 Two transverse bars (11) are horizontally and securely attached to a bottom face  
6 of the seat (10). A first cross bar (13) and a second cross bar (14) are sandwiched  
7 between the two transverse bars (11). An inner side face of each of the two transverse  
8 bars (11) is provided with multiple adjusting holes (110) to respectively receive therein a  
9 spring-driven positioning lever (131). That is, two spring-driven positioning levers (131)  
10 are respectively received inside two mutually aligned adjusting holes (110) respectively  
11 defined in the inner side faces of the two transverse bars (11) to position one of the legs  
12 (12). Because the structure and function of how the positioning lever (131) works is the  
13 same as that described in the description to Fig. 9, detailed description thereof is thus  
14 omitted.

15 With reference to Figs. 2 and 3 for a better understanding of the structure of the  
16 present invention, it is noted that opposite to the adjusting holes (110), multiple securing  
17 holes (112) are defined in the inner side faces of the two transverse bars (11). An arcuate  
18 stop (111) is formed on the inner side face to enclose the securing holes (112).

19 The appropriate leg (12) is securely and fixedly connected to the second cross  
20 bar (14) which is hollow and has two open ends and a window (141) defined through a  
21 periphery of the second cross bar (14). Two securing blocks (20) are movably received  
22 in the hollow second cross bar (14) and respectively have a head (21) formed on a front  
23 face thereof and extending out of the two open ends of the hollow second cross bar (14),  
24 a slit (22) defined in a rear face thereof and a second pin hole (23) defined in a side face

1    thereof to communicate with the slit (22).

2            A driving plate (25) is received in the hollow second cross bar (14) with one  
3    distal end of the driving plate (25) extending out of the window (141) and has a third pin  
4    hole (251) aligned with the first pin hole (142) of the second cross bar (14) to allow a pin  
5    (shown but not labeled) to extend through the aligned first pin hole (142) and the third  
6    pin hole (251) of the driving plate (25) such that the driving plate (25) is pivotally  
7    received inside the second cross bar (14).

8            A first driving plate (24) has a first distal end pivotally connected to a bottom  
9    portion of the driving plate (25) and a second distal end extending through a spring (26)  
10   and into the slit (22) of one of the two securing blocks (20) so that a pin (shown but not  
11   numbered) is able to extend through the second pin hole (23) and into the second distal  
12   end of the first driving plate (24) to secure engagement between the first driving plate  
13   (24) and one of the two securing blocks (20).

14           A second driving plate (27) has a first distal end extending into the slit (22) of  
15   the other securing block (20) to allow a pin (shown but not numbered) to extend through  
16   the second pin hole (23) and into the first distal end of the second driving plate (27) to  
17   secure engagement between the second driving plate (27) and the other securing block  
18   (20). At the moment, pivotal movement of the driving plate (25 ) is able to drive the first  
19   and second driving plates (24,27) to move toward and away from the driving plate (25)  
20   and the two securing blocks (20) are able to selectively extend out of the two open ends  
21   of the second cross bar (14). Furthermore, due to the spring (26) being sandwiched  
22   between one of the two securing blocks (20) and the driving plate (25), the pivotal  
23   movement of the driving plate (25) is able to reciprocally compress the spring (26),  
24   which is able to selectively provide a recoil force to the securing blocks (20) to force the

1     securing blocks (20) to return to their original positions.

2             A substantially U-shaped mounting seat (30) is firmly mounted on the bottom  
3     face of the seat (10) and has a handle (31) pivotally received between the U-shaped  
4     mounting seat (30) in any appropriate method known in the art.

5             With reference to Fig. 4, it is noted that a linking element (40), preferably a  
6     cable, has a first distal end securely connected to a distal end of the linking element (40)  
7     and a second distal end securely connected to the distal end of the driving plate (25)  
8     extending out of the window (141). A major portion of the linking element (40) is  
9     enclosed in an encapsulation (41) and two caps (42,43) are provided to two distal ends  
10    of the encapsulation (41) for protection of the operator.

11            With reference to Figs. 5 and 6, it is noted that when the handle (31) is pivoted in  
12    a direction as indicated in the arrow shown in Fig. 5, the linking mechanism of the  
13    driving plate (25) to the first and second driving plates (24,27) causes the first and  
14    second driving plates (24,27) to move toward the driving plate (25), which also causes  
15    the two securing blocks (20) to move toward each other. After the two securing blocks  
16    (20) are moved, the heads (21) of the two securing blocks (20) leave the corresponding  
17    securing holes (112) on opposite inner side faces of the two transverse bars (11) to allow  
18    the second cross bar (14) to move between the two transverse bars (11). However,  
19    because of the stops (111) on each of the two transverse bars (11), movements of the  
20    securing blocks (20) are limited within the stops (111) to prevent collapses caused by  
21    excessive movement of the securing blocks (20). After the two securing blocks (20) are  
22    re-aligned with two securing holes (112) on opposite transverse bars (11), the operator  
23    releases the handle (31) to allow the recoil force of the spring (26) to return the two  
24    securing blocks (20) to extend out of the two open ends of the second cross bar (14) and

1 into the two aligned securing holes (112) to once again fix the position of the second  
2 cross bar (14) in respect to the seat (10).

3 With reference to Fig. 7 and 8, it is noted that during adjustment of the chair, the  
4 height of the chair is able to be freely adjusted to meet different users of different  
5 heights.

6 With the foregoing description of the adjusting mechanism of the present  
7 invention, it is noted that to activate the adjusting mechanism of the present invention,  
8 the operator only needs to pivot the handle (31) to retract the two securing blocks, move  
9 the second cross bar (14) to an appropriate position and then release the handle (31) to  
10 relocate the two securing blocks (20) to position the second cross bar (14) relative to the  
11 seat (10). Therefore, the height adjustment of the chair of the present invention is easy  
12 and simple without any flipping of the chair.

13 It is to be understood, however, that even though numerous characteristics and  
14 advantages of the present invention have been set forth in the foregoing description,  
15 together with details of the structure and function of the invention, the disclosure is  
16 illustrative only, and changes may be made in detail, especially in matters of shape, size,  
17 and arrangement of parts within the principles of the invention to the full extent  
18 indicated by the broad general meaning of the terms in which the appended claims are  
19 expressed.